

WHAT IS CLAIMED IS:

1. A braking device for a dual bearing reel that brakes a spool that is rotatively mounted on a reel unit, said braking device comprising:

5 a spool braking unit that brakes the spool, the spool braking means including  
a rotor element that rotates together with the spool and includes a plurality  
of magnetic poles that are arranged around a rotational direction of  
the rotor element such that polarities of the magnetic poles are  
sequentially different,  
10 a plurality of serially connected coils that are disposed around a periphery  
of the rotor element in the circumferential direction, and  
switch means that is connected to both ends of the plurality of coils; and  
a spool control unit that electrically controls the spool braking unit, the spool  
control unit including  
15 a circuit board on which the switch means and the plurality of coils are  
mounted, the circuit board being mounted on a surface of the reel  
unit that faces one end surface of the spool, and  
a control element that is mounted on the circuit board.

20 2. The braking device for a dual bearing reel set forth in claim 1, wherein  
the spool is non-rotatably mounted to a spool shaft;  
the rotor element includes a plurality of magnets that are fixedly attached to the  
spool shaft, and  
the plurality of magnets are arranged around the rotational direction of the rotor  
25 element such that the polarities of the magnets are sequentially different.

3. The braking device for a dual bearing reel set forth in claim 2, further  
comprising  
a cap member that is formed from a non-magnetic material and is disposed at end  
30 portions of the plurality of magnets in the spool shaft direction, such that the plurality of

magnets are retained on the spool shaft by the cap member and the plurality of magnets are disposed substantially concentric with the spool shaft.

5           4.       The braking device for a dual bearing reel set forth in claim 2, wherein the number of magnets equals the number of coils.

          5.       The braking device for a dual bearing reel set forth in claim 1, wherein the plurality of coils are coreless coils that are wound into a rectangular frame shape and further curved into arc shapes along a rotational direction of the spool.

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          6.       The braking device for a dual bearing reel set forth in claim 1, wherein the circuit board has a coil holder formed from a non-magnetic material attached thereto; and

          the coils are fixedly attached to the circuit board by being mounted to the coil  
15   holder.

          7.       The braking device for a dual bearing reel set forth in claim 1, wherein the spool is non-rotatably mounted to a spool shaft;  
          the plurality of coils are disposed so as to be substantially concentric with an axial  
20   center of the spool shaft.

          8.       The braking device for a dual bearing reel set forth in claim 1, wherein the spool is non-rotatably mounted to a spool shaft;  
          the circuit board is a washer-shaped member that is disposed so as to be  
25   substantially concentric with the spool shaft.

          9.       The braking device for a dual bearing reel set forth in claim 1, further comprising  
          a first synthetic resin coating film that coats at least a part of the spool control unit  
30   and is made of an insulating material.

          10.      The braking device for a dual bearing reel set forth in claim 1, wherein

the spool control means further includes a condenser element that is mounted on the circuit board, stores electric power generated in the coils, and supplies the electric power to the control element.

5            11.     The braking device for a dual bearing reel set forth in claim 1, further comprising

              electro-optical detection means that is mounted on the circuit board and detects a rotational speed of the spool;

              wherein the spool control unit brakes the spool based on the rotational speed of the  
10     spool detected by the electro-optical detection means.

              12.     The braking device for a dual bearing reel set forth in claim 9, wherein  
              the first synthetic resin coating film is adhered to and formed integral with the  
              spool control unit and the coils respectively by immersing the spool control unit and coils  
15     in a liquid synthetic resin base material.

              13.     The braking device for a dual bearing reel set forth in claim 9, wherein  
              the first synthetic resin coating film is made from a synthetic resin that is formed  
              by a hot melt molding process, in which a resin raw material is injected into a mold, such  
20     that the first synthetic resin covers at least a portion of the circuit board.

              14.     The braking device for a dual bearing reel set forth in claim 13, further  
              comprising  
              a second synthetic resin coating film that coats at least a part of the coils and a part  
25     of the spool control unit on which the first synthetic resin coating film is coated, the  
              second synthetic resin coating film being made of an insulating material.

              15.     The braking device for a dual bearing reel set forth in claim 9, wherein  
              the first synthetic resin coating film is a translucent coating film.  
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              16.     The braking device for a dual bearing reel set forth in claim 9, wherein

the first synthetic resin coating film is a colored synthetic resin through which light passes only partially.

5           17.     The braking device for a dual bearing reel set forth in claim 9, wherein  
the circuit board is mounted to the reel unit with a plurality of screw members  
having head portions, and

the first synthetic resin does not cover portions of the spool control unit on which  
the head portions of the screw members are disposed.

10           18.     The braking device for a dual bearing reel set forth in claim 9, wherein  
the circuit board is mounted to the reel unit by a plurality of screw members having  
head portions, and

15           a thickness of the first synthetic resin coating film formed on portions of the spool  
control unit on which head portions of the screw members are disposed is thinner than a  
thickness of the first synthetic resin coating film formed on other portions of the spool  
control unit.